IV. Remarks

Reconsideration and re-examination of this application in view of the above amendments and the following remarks is herein respectfully requested.

After entering this amendment, claims 31-41 and 43-52 remain pending.

Amendments to the Drawings

Proposed drawing corrections/changes are submitted for the Examiner's approval. The annotated drawings are attached hereto and illustrate the addition of reference elements 103 in Figure 9 as well as the deletion of text from Figures 3-6. Other objections to the drawings have been attended to through the above paragraph amendments.

Claim Rejections - 35 U.S.C. § 112

Claims 31-41 and 43-52 were rejected under 35 U.S.C. § 112, second paragraph, as being indefinite. The Examiner rejected the claims stating that it was unclear how the method of heating would work without "resistance band heaters that heat quickly." Further, the Examiner states that the heating provided by induction heaters "would not likely be used to initiate heating to a high temperature at the beginning of a casting cycle." The Examiner thereafter suggests adding "band heaters" to the claims "as it appears to be required in the processes."

Under § 112 second paragraph, two requirements are set forth: (a) the claims must set forth the subject matter that the applicants regard as their invention; and (b) the claims must particularly point out and distinctly define the meets and bounds of the subject matter that will be protected by any granted patent. As stated in MPEP §

III. Amendments to the Drawings

Replacement sheets of drawings includes changes to Figures 3-6 and 9 are attached, along with an annotated copy identifying changes made. Specific changes to the drawings are discussed in the Remarks section of this Reply.

2171, the first requirement is a subjective one dependant upon what the applicants regard as their invention. The second requirement is an objective one that is evaluated in the context of whether the claim language is clear.

Based on the Examiner's statements, the undersigned interprets the rejection under § 112, second paragraph, as being a rejection based on unclaimed essential matter. The Examiner's suggestion of adding the use of band heaters so as to achieve "initial heating to a high temperature at the beginning of a casting cycle" is directly counter to the stated of purpose and main thrust of the present application. Providing such heaters in the initial zones of the machine would result in all the problems sought to be avoided by the present invention. As described in paragraphs [0026], [0027], [0045] and as seen in Figures 1 and 2a, the Applicants' apparatus initiates heating in zones 1 and 2 through the use of induction heaters. Band heaters are not discussed as being used in this portion of the inventive machine. Again, band heaters in these zones actually create the problems sought to be avoided by the present invention.

Typically, when it is asserted that an essential element is missing from the claim, the element is specified in the application as being required. Here, there is no such recitation in the application of band heaters being used in initial heating. Since the application does not state that band heaters are used as such, the use of band heaters is not a missing step or missing structural cooperative relationship of elements. Accordingly, it is respectfully submitted that the claims do not require the inclusion of band heaters since such elements are not described or asserted as being essential to the invention or as being essentially interrelated.

Further, the claim itself in not ambiguous in this regard; band heaters are not expressed as an element defining the scope of the invention. The uncertainty, in this instance, is not the meaning of the language of the claim. Accordingly, withdrawal of the rejections under § 112 is respectfully requested.

Claim Rejections - 35 U.S.C. §103(a)

The pending claims were rejected under 35 U.S.C. §103(a) as being unpatentable over either Vining, Bradley or Kilbert in view of Brueker et al. Applicant respectfully traverses this rejection.

The basic requirement to establish a prima fascia case of obviousness is that there must be some suggestion or motivation to modify or combine the reference teachings, that there must be a reasonable expectation of success, and the combined references must teach of suggest all of the claim limitations.

Firstly, in the present instance, the Examiner indicates a belief that it is "unlikely" that induction heaters would be used to initiate heating to a high temperature at the beginning of a casting cycle. From this, it is apparent that the use of induction heaters according to the presently claimed method was neither known nor obvious. The Examiner's disbelief itself directly contradicts the rejections made under 35 U.S.C. § 103. Thus, a conclusion on the "unlikelihood" of the claimed invention suggests that there is no reasonable likelihood of success and that the purported combination of the prior references is one being made on hindsight, with knowledge of the claimed invention, and not one based on the teachings of the references themselves as discussed below.

Secondly, there is no motivation suggested by any of the primary references that they could be combined with the Brueker reference. In Vining, Bradley and Kilbert, the feedstock material is fed into a barrel with the material located within the barrel. The barrel must be heated, to heat the material. Additionally, this material is in its initial state and has not yet been processed so as to form a semisolid state. In Brueker and to the contrary, the material is provided to the machine as a preform in a semisolid state. The preform is loaded onto a rotatable table where the preform is moved to the induction heater. At the induction heater, the heating coil are lowered from an elevated position to a descended position where the coil itself encircles the preform. From this is seen that in no time in the Brueker reference is the material located within a barrel as in Vining, Bradley or Kilbert. Also the coil of Brueker is never required to operate through a barrel or other material so as to heat a material located thereinside. Since Brueker uses induction coils to heat a material freestanding within the coils, and not located within a vessel, there is no motivation in the references themselves to combine them as suggested by the Examiner.

In that the references themselves fail to exhibit any motivation for combining them as suggested by the Examiner, and further since the Brueker reference does not indicate operability with any of the systems disclosed in Vining, Bradley or Kilbert (it indicates operability with freestanding preforms only), it must be concluded that the combinations of the references do not render the claims of the present application as obvious. For this reason, the rejection is improper and should be withdrawn.

Finally, none of the references disclose or suggest the process step of maintaining a temperature gradient through the wall thickness of the vessel of less than 100°C. Since the combination of references lack a recited limitation, the rejection under § 103 is improper and should be withdrawn.

As stated above in Brueker no walls are provided about the semisolid metal preform and accordingly there is no reason to consider the impact of a temperature gradient on the vessel, nor is there a suggestion to maintain such a gradient. In

Vining, it is noted in col. 3, ll. 56-58 that the thermal gradients from the interior to the exterior surface of the barrel are seen to be as great as 350°C. Temperature control of the barrel in this reference is based in part on the measured temperature gradient between the interior and exterior surfaces of the barrel. Nothing in the reference, however, discloses or suggests that this gradient should be maintained at 100°C or less. Monitoring a gradient so as to control the temperature of the barrel itself is distinctly different from controlling the range of the gradient. In Vining, the latter is not suggested. Vining utilizes the gradient to minimize to effects of thermocycling, but nothing in Vining suggests minimizing the gradient itself to below 100°C. Rather, Vining suggests minimizing changes in the gradient so as to maintain a barrel temperature, not to control the range of the gradient (see col. 14 ll. 29-36).

In Bradley and Kilbert, minimizing the gradient is not discussed.

Since neither Vining, Bradley, Kilbert nor Brueker disclose maintaining a temperature gradient of less than 100°C through the wall of the vessel, it must be concluded that the combination cannot render the claims of the present application as obvious. The rejection under §103 is therefore improper and should be withdrawn.

Conclusion

In view of the above amendments and remarks, it is respectfully submitted that the present form of the claims are patentably distinguishable over the art of record and that this application is now in condition for allowance. Such action is requested.

Respectfully submitted,

October 12, 2004
Date

Eric J. Sosenko (Reg. No. 34,440)

Attachment: Replacement Sheet(s) of Drawings
Annotated Sheet(s) of Drawings

ANNOTATED DRAWINGS

OIPE JC130
OCT 1 4 2004
PATENT & TRADEMARK OFFICE

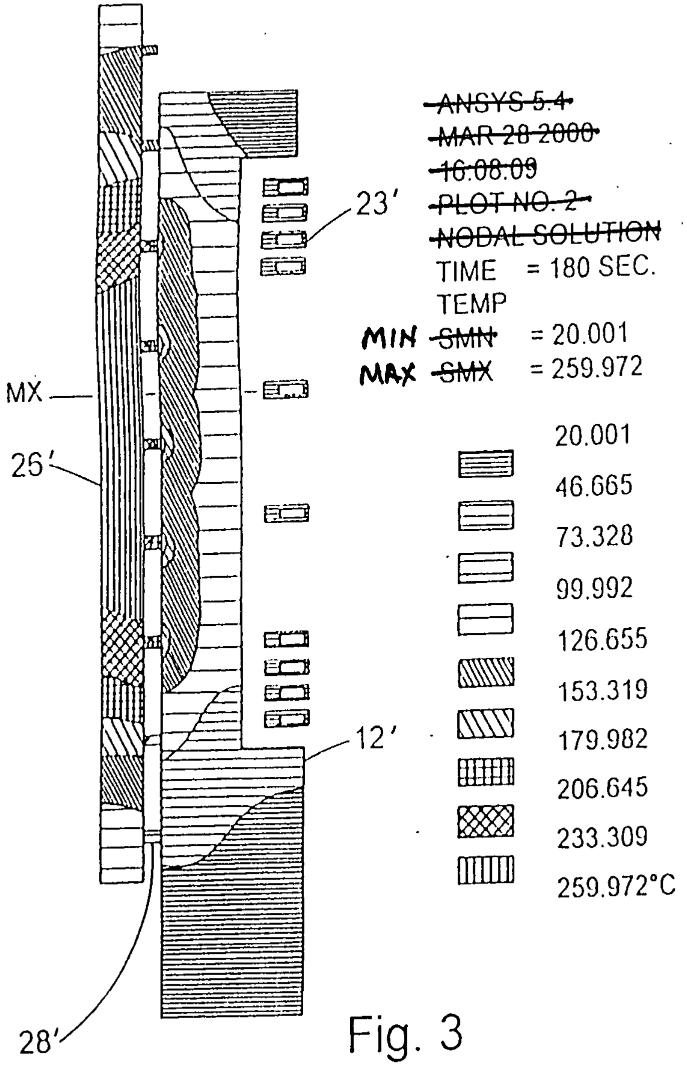

Fig. 3

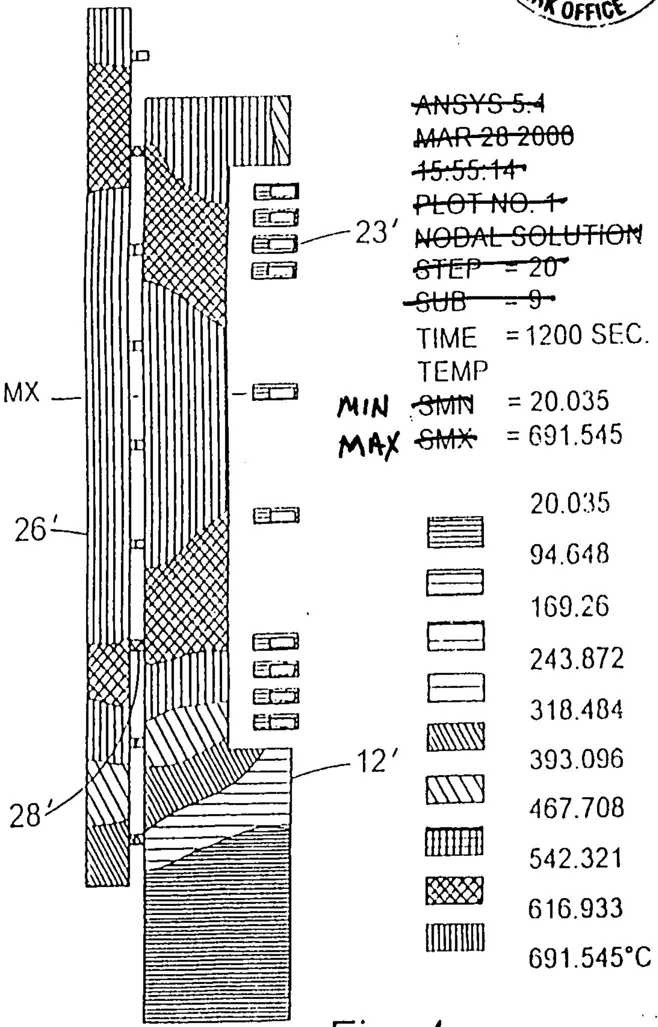

Fig. 4

ANNOTATED DRAWINGS

OIPE JC130
OCT 14 2004
PATENT & TRADEMARK OFFICE

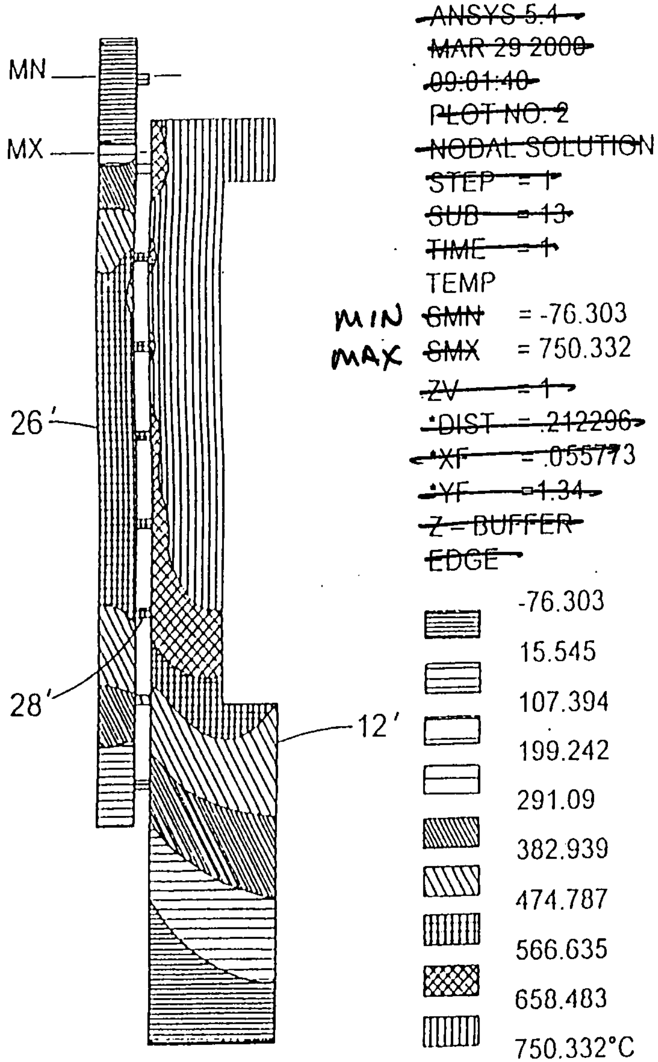

Fig. 5

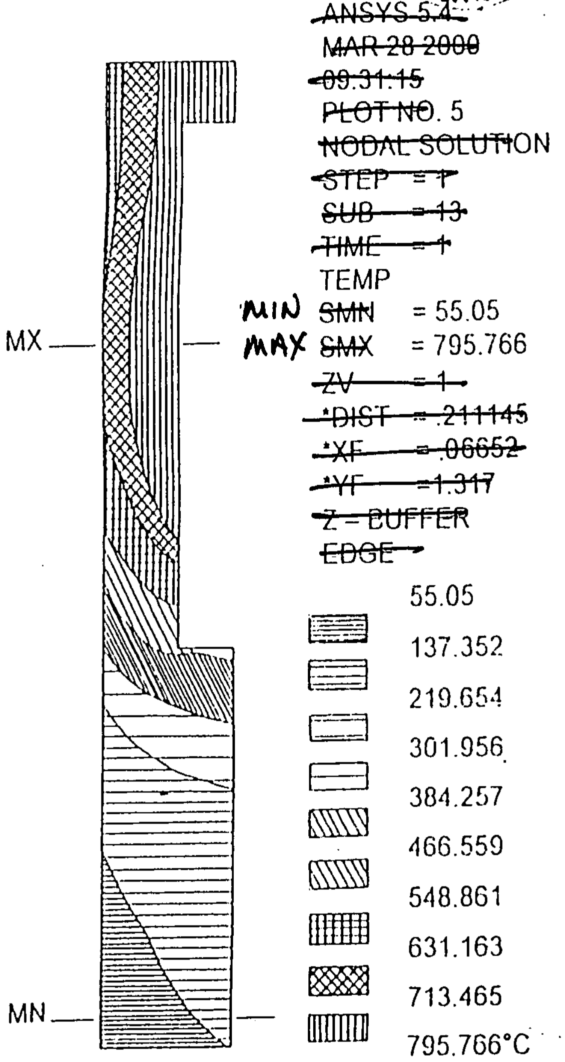

Fig. 6

Annotated Drawings

OIPE JC130
OCT 14 2004
PATENT & TRADEMARK OFFICE

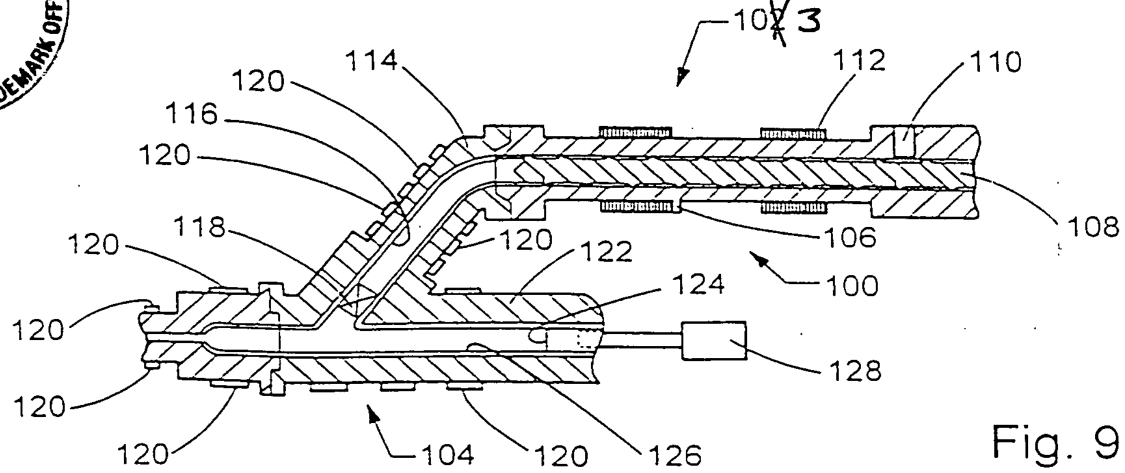

Fig. 9

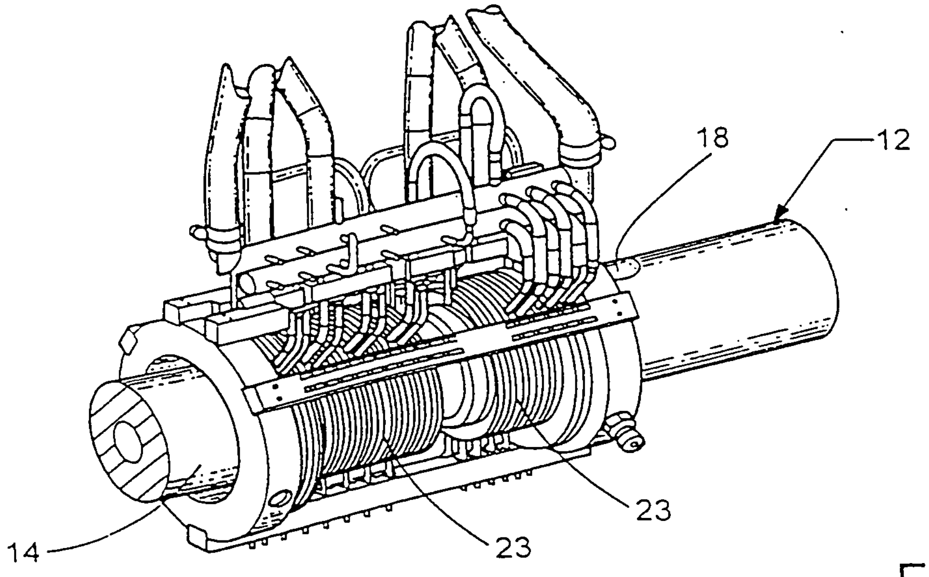

Fig.10